

Claims

- [c1] 1. A ceramic thermal barrier coating, TBC, deposited and attached directly to a metallic substrate (2) or an intermediate bond coating (3) deposited on such a substrate (2), said TBC comprising:
at least two layers (4,5) wherein a first, inner TBC layer (4) is directly attached to one of a substrate (2) and a bond coating (3) and presents a different microstructure than a second, outer TBC layer (5).
- [c2] 2. The ceramic thermal barrier coating as recited in claim 1, wherein the first layer (4) presents a lower porosity than the second layer (5).
- [c3] 3. The ceramic thermal barrier coating as recited in claim 1, wherein the second layer (5) has a lower thermal conductivity than the first layer (4), the lower thermal conductivity deriving from the difference in microstructure.
- [c4] 4. The ceramic thermal barrier coating as recited in claim 1, wherein the first layer (4) has higher strength than the second layer (5), the higher strength deriving from the difference in microstructure.

- [c5] 5. The ceramic thermal barrier coating as recited in claim 1, wherein the second TBC layer (5) defines an outer layer directly exposed to the environment.
- [c6] 6. The ceramic thermal barrier coating as recited in claim 1, wherein the first and second layers (4,5) have the same chemical composition.
- [c7] 7. The ceramic thermal barrier coating as recited in claim 1, further comprising stabilized zirconia, preferably dysprosia-stabilized zirconia.
- [c8] 8. The ceramic thermal barrier coating as recited in claim 1, wherein the ceramic thermal barrier coating is applied by means of thermal spraying process.
- [c9] 9. The ceramic thermal barrier coating as recited in claim 8, wherein the thermal spraying process comprises plasma spraying.
- [c10] 10. The ceramic thermal barrier coating as recited in claim 1, further comprising a bond coating (3) sandwiched between the substrate (2) and the ceramic thermal barrier coating (1).
- [c11] 11. The ceramic thermal barrier coating as recited in claim 1, further comprising:
a plurality of powder particles composing the ceramic

thermal barrier coating, each of the plurality of powder particles comprising an agglomerate of powder grains surrounded by a shell of melted powder material.

- [c12] 12. A method of applying a ceramic thermal barrier coating (1), TBC, on a substrate (2), the TBC being applied on the substrate (2) or an intermediate bond coating (3) between the substrate (2) and the TBC, comprising:
- applying at least two layers (4,5) comprising a first TBC layer and a second TBC layer of ceramic TBC upon one of a substrate (2) and a bond coating (3); and
- causing the powder particles used for applying a first TBC layer (4) adjacent to one of the sub(2) and the bond coating (3) to present a different microstructure than the powder particles used for a subsequently applied second TBC layer (5).
- [c13] 13. The method as recited in claim 12, wherein the powder particles that constitute the first TBC layer (4) present a lower porosity than the powder particles that constitute a subsequently applied second TBC layer (5).
- [c14] 14. The method as recited in claim 12, wherein the powder particles that constitute the first TBC layer (4) present a dense sintered structure.

- [c15] 15. The method as recited in claim 14, further comprising sintering agglomerates of powder grains to the powder particles.
- [c16] 16. The method as recited in claim 12, wherein the powder particles constituting the second TBC layer (5) present a porous structure.
- [c17] 17. The method as recited in claim 12, wherein each powder particle comprises an agglomerate of powder grains surrounded by a shell of melted powder material.
- [c18] 18. The method as recited in claim 17, further comprising HOSP-treatment of the agglomerates of powder grains in order to form powder particles.
- [c19] 19. The method as recited in claim 12, wherein the first and second ceramic TBC layers (4,5) have the same chemical composition.
- [c20] 20. The method as recited in claim 12, wherein the TBC further comprises stabilized zirconia.
- [c21] 21. The method as recited in claim 12, wherein the stabilized zirconia is dysprosia-stabilized zirconia.
- [c22] 22. The method as recited in claim 12, wherein a diameter of the powder particles is 10–150 micrometers.
23. The method as recited in claim 12, wherein a diame–

ter of powder grains forming the powder particles is 0.5 – 5.0 micrometers, preferably 1–2 micrometers.

[c23] 24. The method as recited in claim 23, wherein the diameter of the powder grains forming the powder particles is 1.0 – 2.0 micrometers.

[c24] 25. The method as recited in claim 12, wherein the TBC is applied by means of thermal spraying of a ceramic powder on one of the substrate (2) and bond coating (3).

[c25] 26. The method as recited in claim 12, wherein the TBC is applied utilizing plasma spraying.